

**Demonstration of Waste Treatment Technologies  
in the Mixed Waste Management Facility at LLNL\***

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The Mixed Waste Management Facility (MWMF) is a national demonstration test bed that will be used to evaluate, at pilot scale, emerging technologies for the effective treatment of low-level radioactive, organic mixed wastes. The treatment technologies will be selected from candidates of advanced processes that have been sufficiently demonstrated in laboratory and bench-scale tests, and most closely meet suitable criteria for demonstration. The primary goal will be to demonstrate technologies that have the potential to effectively treat a selection of organic-based mixed waste streams, currently in storage within the DOE, that list incineration as the best demonstrated available technology (BDAT).

Two primary waste treatment technologies have been selected for initial demonstration in MWMF. They are Molten Salt Oxidation (MSO) and Mediated Electrochemical Oxidation (MEO). MSO destroys the organic constituent of the waste as a result of both the elevated temperature (700-950°C) and catalytic behavior of salt. The radioactive materials and other inorganic constituents are trapped in the molten salt for subsequent processing (salt recycle or direct final forms). Extensive experience on laboratory-, bench-, and pilot-scale MSO units has been obtained. Research and development over the last twenty years on coal gasification, organic material, and hazardous waste destruction, and destruction of high explosives and propellants has demonstrated the versatility and effectiveness of this process.

The MEO process destroys organic compounds by employing an acid solution in conjunction with metallic ions in an electrochemical cell. The process operates at ambient pressures and near-ambient temperatures (usually less than 75°C). It is ideally suited for treating aqueous-organic and organic liquid wastes, although it can also destroy cellulosic (paper and cloth), rubber (latex) and plastic (polyethylene) wastes. A full-scale unit cell for the MEO process has been demonstrated successfully at LLNL. Scale-up for MWMF will entail paralleling multiple unit cells and providing the integrated process support systems. The waste streams treated by the MEO process are generally complementary to those treated by incineration or MSO.

Conceptual design for the MWMF project has been completed with these two primary treatment technologies, supported by waste characterization, sorting and feed preparation, off-gas and product water treatment, and preparation of robust solid final forms. Preliminary design of the processes is currently underway.

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